Complete Summary

GUIDELINE TITLE

Glomerulonephritis.

BIBLIOGRAPHIC SOURCE(S)

Singapore Ministry of Health. Glomerulonephritis. Singapore: Singapore Ministry of Health; 2007 Mar. 130 p. [234 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Singapore Ministry of Health. Glomerulonephritis. Singapore: Singapore Ministry of Health; 2001 Oct. 132 p.

The workgroup advises that these guidelines be scheduled for review five years after publication, or if new evidence appears that requires substantive changes to the recommendations.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory information has been released.

- July 31, 2008, Erythropoiesis Stimulating Agents (ESAs): Amgen and the U.S. Food and Drug Administration (FDA) informed healthcare professionals of modifications to certain sections of the Boxed Warnings, Indications and Usage, and Dosage and Administration sections of prescribing information for Erythropoiesis Stimulating Agents (ESAs). The changes clarify the FDA-approved conditions for use of ESAs in patients with cancer and revise directions for dosing to state the hemoglobin level at which treatment with an ESA should be initiated.
- June 30, 2008, CellCept (mycophenolate mofetil) and Myfortic (mycophenolate acid): Novartis and Roche have agreed to include additional labeling revisions to the WARNINGS and ADVERSE REACTIONS sections of the Myfortic and CellCept prescribing information, based on post-marketing data regarding cases of Progressive Multifocal Leukoencephalopathy (PML) in patients treated with these drugs.
- November 8, 2007 and January 3, 2008 Update, Erythropoiesis Stimulating Agents (ESAs): The U.S. Food and Drug Administration (FDA) notified healthcare professionals of revised boxed warnings and other safety-related product labeling changes for erythropoiesis-stimulating agents (ESAs) stating

serious adverse events, such as tumor growth and shortened survival in patients with advanced cancer and chronic kidney failure.

- October 29, 2007, CellCept (mycophenolate mofetil): Roche has agreed to include additional labeling revisions to the BOXED WARNING, WARNINGS/Pregnancy and Pregnancy Exposure Prevention, PRECAUTIONS/Information for Patients, and ADVERSE REACTIONS/Postmarketing Experience sections.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Glomerulonephritis

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Risk Assessment
Treatment

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Nephrology

INTENDED USERS

Health Care Providers
Physicians

GUIDELINE OBJECTIVE(S)

- To address some of the complex issues wherever evidence-based information pertaining to these is available
- To help doctors in clinical decision making by providing balanced information on the management of patients with glomerulonephritis, without restricting the physician's individual clinical judgement

TARGET POPULATION

Adults in Singapore presenting with symptoms of glomerular disease

INTERVENTIONS AND PRACTICES CONSIDERED

Management of Haematuria -- Diagnostic Assessment

1. Urinalysis
2. Detailed history including description of urinary symptoms, recent medical history, past medical history, drug history and family history
3. Physical examination including blood pressure measurement, skin examination for purpura and digital vasculitis, throat/ tonsil inspection, cardiac auscultation for murmurs, signs of fluid overload, abdominal examination for enlarged, ballotable kidneys or other organomegaly, digital rectal examination of the prostate in males
4. Laboratory evaluation including full blood count, renal function tests, urine culture, urine phase contrast microscopy, and urine protein measurement
5. Nephrological referral, as required
6. Imaging studies, including intravenous urography, ultrasonography, flexible cystourethroscopy

Management of Proteinuria -- Diagnostic Assessment

1. Detailed history including description of urinary symptoms, past medical history and drug history
2. Physical examination including blood pressure, signs of end organ damage due to hypertension, signs of renal failure, signs of diabetes or auto-immune disease, oedema
3. Laboratory evaluation including urinalysis; urine culture; serum urea, creatinine and fasting glucose; serum albumin; 24-hour urine collection for quantification (24-hour total urinary protein) OR random or spot urinary protein and creatinine measurement
4. Nephrological evaluation including ultrasound of the kidneys; urine phase contrast microscopy; 24-hour urinary creatinine clearance
5. Renal biopsy

Management of Glomerulonephritis -- General Measures

1. Establishing the type of glomerulonephritis and its severity
2. Blood pressure management: establishing target blood pressures and treatment of hypertension with angiotensin-converting enzyme (ACE) inhibitor therapy, angiotensin receptor blockers, diuretics, beta blockers, and calcium channel blockers; lifestyle modifications

3. Management of renal dysfunction: monitoring for complications; evaluation and treatment of anemia; monitoring serum calcium, phosphate and parathyroid hormone levels and treatment with calcium-based phosphate binder and vitamin D sterols; lipid-lowering therapy; sodium bicarbonate for acidosis

Specific Management Measures (Dependent on the Type and Degree of Histological Changes)

1. Immunosuppressive therapies including corticosteroids (e.g., high-dose prednisolone), alkylating agents (e.g., cyclophosphamide), other cytotoxics (e.g., cyclosporin A, mycophenolate mofetil, tacrolimus)
2. Monitoring of haematuria and proteinuria
3. Angiotensin converting enzyme inhibitors and angiotensin II receptor blockers
4. Antithrombotics, such as dipyridamole and warfarin
5. Dietary supplementation with fish oil
6. Intravenous immunoglobulin
7. Plasma exchange (plasmapheresis)

MAJOR OUTCOMES CONSIDERED

- Progression of renal disease as measured by degree of proteinuria and other renal function tests
- Blood pressure control
- Renal survival
- Rates of complete and partial remission
- Mean time to achieve remission and duration of remission
- Relapse rates
- Incidence of adverse drug effects
- Rates of steroid dependence and steroid resistance

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Level Ia: Evidence obtained from meta-analysis of randomised controlled trials.

Level Ib: Evidence obtained from at least one randomised controlled trial.

Level IIa: Evidence obtained from at least one well-designed controlled study without randomisation.

Level IIb: Evidence obtained from at least one other type of well-designed quasi-experimental study.

Level III: Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.

Level IV: Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

These guidelines have been produced by a Workgroup comprised of members of the National Committee on Renal Care appointed by the Ministry of Health. The guidelines were developed using the best available current evidence and expert opinion.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grades of Recommendation

Grade A (evidence levels Ia, Ib): Requires at least one randomized controlled trial as part of the body of literature of overall good quality and consistency addressing the specific recommendation.

Grade B (evidence levels IIa, IIb, III): Requires availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation.

Grade C (evidence level IV): Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality.

Good Practice Points (GPP): Recommended best practice based on the clinical experience of the guideline development group.

COST ANALYSIS

Published cost analyses were reviewed. Some of the findings were as follows:

In a study on US adults, mass screening for proteinuria as a preventive strategy for end stage renal disease, was not cost-effective. The cost-effectiveness ratio for mass screening versus no screening (usual care) was unfavourable ($282,818 per quality-adjusted life year [QALY] saved). However, cost-effective ratio was favourable for those who were at risk of kidney disease (e.g. patient ≥60 years [$53,372 per QALY] or patients with hypertension [$18,621 per QALY]).

An economic analysis comparing an angiotensin-converting enzyme (ACE) inhibitor, ramipril, with conventional therapy for treatment of hypertension in chronic kidney disease revealed that ramipril delayed progression to end stage renal disease and prolonged patient survival and also saved $16,605 to $23,894 lifetime and $2,422 to $4,203 yearly direct cost per patient. This study showed that ACE inhibitors prolonged life while saving money because of its beneficial effect on the course of non-diabetic chronic nephropathies.

METHOD OF GUIDELINE VALIDATION

Not stated

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not applicable

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from the National Guideline Clearinghouse (NGC): This guideline has been updated. For a list of major changes or additions to the guideline, refer to Section 1.4 of the original guideline document.

The recommendations that follow are those from the guideline's executive summary; detailed recommendations can be found in the original guideline document. Each recommendation is rated based on the level of the evidence and the grades of recommendation. Definitions of the grades of the recommendations

(A, B, C, Good Practice Point [GPP]) and level of the evidence (Level I - Level IV) are presented at the end of the Major Recommendations field.

Management of Haematuria and Proteinuria

C - Screening to detect microscopic haematuria and proteinuria in asymptomatic population is not recommended. However, screening using dipstick analysis should be done for individuals at risk for kidney disease (**Grade C, Level IV**).

B - Patients with microscopic haematuria ($\geq$3 red blood cells/high-power field [RBCs/hpf]) should be evaluated to exclude renal/urinary tract disease (Woolhandler et al., 1989; "Clinical Practice Guidelines: Health screening," 2003; Grossfeld et al., 2001) (**Grade B, Level III**).

B - Urine phase contrast microscopy under standard conditions is recommended to differentiate glomerular from non-glomerular sources of haematuria (Yun, Meng, & Carroll, 2004; Georgopoulos et al., 1996; Schramek et al., 1989) (**Grade B, Level III**).

B - Patients with microhaematuria should be evaluated for the presence of hypertension, proteinuria and renal impairment (Yun, Meng, & Carroll, 2004; Kincaid-Smith & Fairly, 2005) (**Grade B, Level III**).

B - Patients with isolated glomerular microhaematuria should remain on follow-up at 6 to 12 month intervals to monitor blood pressure, proteinuria, and renal function (Yun, Meng, & Carroll, 2004; Kincaid-Smith & Fairly, 2005) (**Grade B, Level III**).

B - Patients with microhaematuria of non-glomerular origin should undergo evaluation to exclude urinary tract disease (Yamagata et al., 1996; Cohen & Brown, 2003; Mariani et al., 1989; Froom, Ribak, & Benbassat, 1984) (**Grade B, Level III**).

Table: C -- History, Physical Examination and Laboratory Evaluation for Patients with Haematuria

History
Urinary Symptoms: • Dysuria, frequency • Previous gross haematuria • Ureteric or renal colic • Symptoms suggestive of bladder outlet obstruction such as poor stream and dribbling Past Medical History: • Autoimmune diseases • Pelvic oncological radiotherapy • Sexually transmitted diseases pre-disposing to urethritis and urethral stricture

- Renal trauma
- Previous renal or extra-renal tuberculosis
- Lower or upper urinary tract infections

Drug History:

- Warfarin
- Non-steroidal anti-inflammatory drugs
- Previous cytotoxic/immunosuppressive therapy
- Exposure to chemicals (benzene, aromatic amines, leather dyes, chemicals in rubber or tyre manufacture)
- Cigarette smoking
- History of consuming herbal slimming remedies (example: those containing aristocholic acid)
- Drugs that may cause a false positive dipstick reaction such as certain antiseptic solutions

Family History of:

- Primary renal disease
- Hypertension
- Adult polycystic kidney disease (APCKD)
- Deafness suggestive of Alport's syndrome
- Urolithiasis
- Microscopic haematuria

Other:

- Recent upper respiratory tract infection (URTI) or tonsillitis suggesting post-infectious glomerulonephritis
- Ongoing URTI and/or gastroenteritis (GE), suggesting immunoglobulin A (IgA) nephropathy
- Constitutional symptoms such as myalgia, arthralgia and cutaneous rash, suggesting Henoch-Schonlein purpura or crescenteric glomerulonephritis
- Diabetes mellitus and diabetic nephropathy
- Evidence of a bleeding diathesis

Physical Examination for Patients with Haematuria

Blood pressure

Skin examination for purpura, digital vasculitis

Throat/tonsil inspection

Cardiac auscultation for murmurs

Signs of fluid overload

Abdominal examination for enlarged, ballotable kidneys or other organomegaly Digital rectal examination of the prostate in males
Initial Laboratory Investigations for Patients with Haematuria Full blood count Renal function tests: serum urea, creatinine and electrolytes Urine culture • Microbiology proven urinary tract infections should first be treated and urinalysis re-checked before further tests are done Urine phase contrast microscopy Urine protein measurement (24-hour urinary protein or urine protein/creatinine ratio)

(Grade C, Level IV)

C - In the absence of contraindications, intravenous urography (IVU) is the recommended initial imaging of choice for investigation of non-glomerular bleeding and may be complemented by ultrasonography (Yip et al., 1998; Sultana et al., 1996) (**Grade C, Level IV**).

B - Patients with orthostatic proteinuria have a good renal prognosis and do not require follow- up (Woolhandler et al., 1989; Springberg et al., 1982) (**Grade B, Level III**).

B - Patients with proteinuria should be evaluated for the presence of microhaematuria, hypertension, and renal impairment (Woolhandler et al., 1989; Grossfeld et al., 2001; Yun, Meng & Carroll, 2004; Kincaid-Smith & Fairley, 2005) (**Grade B, Level III**).

B - Patients with intermittent isolated proteinuria have a favourable renal prognosis but should be followed up six monthly until resolution of proteinuria (Yamagata et al., 1996; Springberg et al., 1982; Robinson, 1980) (**Grade B, Level III**).

B - Patients with persistent isolated proteinuria should be followed-up indefinitely with monitoring of the blood pressure and renal function since the risk of subsequently developing renal insufficiency is higher (Robinson, 1980) (**Grade B, Level III**).

B - Patients with persistent proteinuria $\geq$1g/day should undergo renal biopsy as they are at risk for adverse renal histopathology and therefore worse renal outcome (Stenvinkel, Alvestrand, & Bergstrom, 1989; Lim, Woo, & Chiang, 1982; Woo et al., 1986; Cheong et al., 1991) (**Grade B, Level III**).

Table: GPP -- History, Physical Examination and Laboratory Evaluation for Patients with Proteinuria

History:

Urinary Symptoms:

- Dysuria, frequency to exclude urinary tract infection

Past Medical History of:

- Childhood glomerulonephritis
- Pre-eclampsia in women
- Autoimmune conditions
- Diabetes
- Cardiac failure

Drug History:

- Gold, penicillamine and captopril in relation to secondary membranous nephropathy
- Non-steroidal anti-inflammatory drugs (NSAIDS) or penicillins in relation to (allergic) intestinal nephritis

Physical Examination:

Blood pressure

Signs of end organ damage due to hypertension

Signs of renal failure

Signs of diabetes or auto-immune disease

Oedema

Initial Laboratory Investigations:

Urinalysis for haematuria and glycosuria (if not already performed)

Fresh mid-stream urine specimen for culture

Serum urea, creatinine and fasting glucose (in the presence of glycosuria)

Serum albumin

24-hour urine collection for qualifications (24-hour UTP)

or

Random spot urinary protein and creatinine measurement to derive the urinary protein/creatinine ratio (PCR). PCR ≥200 mg/g indicates elevated urine protein content Exclusion of monoclonal gammopathy in subject >45 years of age Ultrasound of the kidneys to evaluate structure and size Urine phase contrast microscopy 24-hour urinary creatinine clearance (CCT) **or** Glomerular filtration rate (GFR) calculation
Nephrological Evaluation: Renal biopsy if proteinuria ≥ 1 g/day and/or rapidly worsening renal dysfunction in the absence of other causes (both renal and systemic causes)

(Scottish Intercollegiate Guidelines Network (SIGN), 1997) (**GPP**)

B - Patients with microhaematuria and either proteinuria, or hypertension, or renal impairment should be referred to a nephrologist for further evaluation (Woo et al., 1986; Cheong et al., 1991; Klahr, 1997) (**Grade B, Level III**).

B - All patients with gross haematuria should be evaluated for urological pathology with a combination of ultrasound, intravenous urography and flexible cystourethroscopy (Yip et al., 1999; Khadra et al., 2000) (**Grade B, Level III**).

General Measures in Management of Patients with Glomerulonephritis

A - Patients with glomerulonephritis should be evaluated to establish the type of glomerulonephritis and identify its severity (Third Report of the Singapore Renal Registry, 1999/2000; National Kidney Foundation [NKF]-Kidney Disease Outcomes Quality Initiative Group [K/DOQI], 2002; Schieppati et al., 2004; Samuels et al., 2004) (**Grade A, Level Ib**).

A - Testing for level of renal function, degree of proteinuria, renal biopsy and other investigation should be performed as indicated ("K/DOQI clinical practice guidelines for chronic kidney disease," 2002) (**Grade A, Level Ib**).

C - Patients should be followed up to assess progression of glomerulonephritis. Renal function, proteinuria and other markers should be monitored on follow up, as indicated by type of glomerulonephritis and severity of condition. The severity of kidney disease should be identified based on these markers ("K/DOQI clinical practice guidelines for chronic kidney disease," 2002) (**Grade C, Level IV**).

A - Specific therapy of glomerulonephritis should be instituted as indicated by type and severity of underlying condition (Schieppati et al., 2004; Samuels et al., 2004) (**Grade A, Level Ia**).

A - As the level of proteinuria predicts the rate of progression of renal disease, general measures should be instituted to reduce proteinuria in patients with glomerulonephritis (Jafar et al., 2001) (**Grade A, Level Ia**).

A - Angiotensin converting enzyme inhibitors should be used to reduce proteinuria and retard progression, in the absence of hypertension, in patients with glomerulonephritis (Jafar et al., 2001) (**Grade A, Level Ia**).

B - Angiotensin receptor blockers can be used as an alternative to angiotensin converting enzyme inhibitors to reduce proteinuria and retard progression in patients with glomerulonephritis (Woo et al., 2000; Mora-Macia et al., 2001) (**Grade B, Level IIb**).

A - Angiotensin converting enzyme inhibitors can be combined with angiotensin receptor blockers to reduce proteinuria and retard progression in patients with glomerulonephritis. (Nakao et al., 2003) (**Grade A, Level Ib**).

B - Proteinuria should be reduced to <0.5 g/day with therapy in patients with glomerulonephritis (Ruggenenti, Perna, & Remuzzi, 2003) (**Grade B, Level III**).

GPP - Patients with glomerulonephritis and renal failure (GFR <25 mL/min), who are not on maintenance dialysis and have no evidence of malnutrition, should be considered for a low-protein diet providing 0.8 g protein/kg body weight/day. At least 50% of dietary protein should be of high biologic value (**GPP**).

C - A diet providing 35 kcal/kg body weight/day is recommended in patients with renal failure (GFR <25 mL/min) to maintain neutral nitrogen balance, to promote higher serum albumin concentrations and more normal anthropometric parameters ("Clinical practice guidelines for nutrition," 2000) (**Grade C, Level IV**).

Management of Hypertension in Patients with Glomerulonephritis

A - Hypertension defined as blood pressure $\geq$140/90 mm Hg should be treated in patients with glomerulonephritis in order to retard the rate of deterioration of renal function (Jafar et al., 2003) (**Grade A, Level Ia**).

C - Hypertension should be treated in patients with glomerulonephritis so as to reduce the risk for cardiovascular disease (Chobanian et al., 2003) (**Grade C, Level IV**).

A - A target blood pressure less than 130/80 mm Hg (mean arterial pressure <98 mm Hg) is recommended for patients with glomerulonephritis and proteinuria $\leq$1 g/day (Sarnak et al., 2005) (**Grade A, Level Ia**).

A - A target blood pressure less than 125/75 mm Hg (mean arterial pressure <92 mm Hg) is recommended for patients with glomerulonephritis and proteinuria >1 g/day (Jafar et al., 2001) (**Grade A, Level Ia**).

A - More than one anti-hypertensive drug may be required to achieve target blood pressure in patients with glomerulonephritis (Sarnak et al., 2005) (**Grade A, Level Ib**).

A - Any anti-hypertensive agent may be used to control blood pressure in patients with glomerulonephritis (**Grade A, Level Ia**).

A - Angiotensin converting enzyme inhibitors are recommended as preferred treatment of hypertension in patients with glomerulonephritis as they confer greater renoprotection (**Grade A, Level Ia**).

B - Angiotensin receptor blockers can be used as an alternative to angiotensin converting enzyme inhibitors to treat hypertension in patients with glomerulonephritis (Woo et al., 2000; Remuzzi et al., 1999) (**Grade B, Level IIa**).

B - Angiotensin receptor blockers may be used in combination with angiotensin converting enzyme inhibitors to treat hypertension in patients with glomerulonephritis (Nakao et al., 2003) (**Grade B, Level IIa**).

A - Diuretics are preferred 2nd line antihypertensive agents in patients with glomerulonephritis as they reduce the risk for cardiovascular disease (Rahman et al., 2006) (**Grade A, Level Ib**).

B - Beta blockers and calcium channel blockers can be used alternatively to control blood pressure in patients with glomerulonephritis (Douglas & Agodoa, 2003; Herlitz et al., 2001) (**Grade B, Level IIa**).

C - Lifestyle modifications should be begun simultaneously as part of a comprehensive strategy to lower blood pressure and cardiovascular risk (K/DOQI, 2004) (**Grade C, Level IV**).

C - Patients with hypertension and glomerulonephritis should be monitored regularly for blood pressure, renal function, and level of proteinuria (K/DOQI, 2004; Chobanian et al., 2003) (**Grade C, Level IV**).

C - Patients receiving an angiotensin converting enzyme inhibitor or angiotensin receptor blocker should be monitored for decrease in renal function and hyperkalaemia (K/DOQI, 2004) (**Grade C, Level IV**).

C - Angiotensin converting enzyme inhibitors or angiotensin receptor blockers can be continued in patients with decrease in renal function of <30% over 4 months or serum potassium $\leq$5.5 mmol/L (K/DOQI, 2004) (**Grade C, Level IV**).

C - Angiotensin converting enzyme inhibitors or angiotensin receptor blockers should not be used in pregnant patients or in those with drug-induced angioaedema or allergy. They should also be used with caution in patients with

renal artery stenosis or severe hyperkalaemia (K/DOQI, 2004) (**Grade C, Level IV**).

Management of Renal Dysfunction in Patients with Glomerulonephritis

B - Patients with glomerulonephritis and estimated glomerular filtration rate <60 mL/min/1.73 m^2 should be assessed for complications of renal failure, including anaemia and bone disease ("K/DOQI clinical practice guidelines for chronic kidney disease," 2002; National Kidney Foundation, 2003) (**Grade B, Level III**).

C - Patients with glomerulonephritis should be monitored for complications of the underlying condition, risk factors for cardiovascular disease and side effects of therapy (K/DOQI, 2004; Weiner et al., 2004) (**Grade C, Level IV**).

B - Patients with renal dysfunction should be initiated on renal replacement therapy when indicated by symptoms of renal failure and/or biochemical investigations (Kazmi et al., 2004) (**Grade B, Level III**).

B - Patients with glomerulonephritis and estimated glomerular filtration rate <60 mL/min/1.73 m^2 should be evaluated for the presence of anaemia by measuring hemoglobin periodically (NKF-K/DOQI, 2001) (**Grade B, Level III**).

B - Further evaluation of anaemia should be initiated in patients with glomerulonephritis and renal dysfunction when:

- Hemoglobin is <11 g/dL in pre-menopausal females and prepubertal patients
- Hemoglobin <12 g/dL in adult males and post-menopausal females (NKF-K/DOQI, 2001) (**Grade B, Level III**)

B - Evaluation of anaemia should include:

- Red cell indices
- Reticulocyte count
- Iron parameters (serum iron, total iron binding capacity, percent transferrin saturation and serum ferritin)
- Tests for occult blood in stools (NKF-K/DOQI, 2001) (**Grade B, Level III**)

A - Patients with anaemia due to renal dysfunction should be treated with supplemental iron to maintain percent transferrin saturation >20% and serum ferritin level >100 ng/mL (Macdougall et al., 1996) (**Grade A, Level Ib**).

A - Anaemia due to renal dysfunction should be treated with erythropoietin therapy (Eschbach et al., 1989) (**Grade A, Level Ia**).

A - Target for haemoglobin for patients with renal dysfunction should be 12 g/dL. Target range for haemoglobin is for erythropoietin therapy and is not an indication for blood transfusion (Strippoli et al., 2004) (**Grade A, Level Ia**).

B - Adverse effects of erythropoietin therapy including hypertension should be monitored in patients with glomerulonephritis and renal dysfunction (NKF-K/DOQI, 2001) (**Grade B, Level III**).

B - Serum levels of calcium, phosphorus and intact plasma parathyroid hormone levels should be measured in patients with glomerulonephritis and estimated glomerular filtration rate (eGFR) <60 mL/min/1.73 m^2 (National Kidney Foundation, 2003; Brossard et al., 2000) (**Grade B, Level III**).

B - Patients with glomerulonephritis and chronic renal dysfunction should receive therapy to control serum phosphate, calcium and parathyroid hormone levels so as to reduce onset of hone disease due to secondary hyperparathyroidism (Combe et al., 1993; Tsukamoto et al., 1995; Goodman et al., 2000) (**Grade B, Level III**).

C - Serum calcium, phosphate and parathyroid hormone levels should be monitored at 3 to 12 monthly internals in patients with glomerulonephritis and chronic renal dysfunction (National Kidney Foundation, 2003) (**Grade C, Level IV**).

C - Phosphate levels should be maintained between 2.7 and 4.6 mg/dL (0.87 and 1.49 mmol/L) in patients with chronic renal dysfunction (National Kidney Foundation, 2003) (**Grade C, Level IV**).

B - Dietary phosphate should be restricted to 800 to 1000 mg/day (adjusted for dietary protein needed) when serum phosphate levels are elevated above 4.6 mg/dL or when parathyroid hormone levels are elevated (Combe et al., 1993) (**Grade B, Level III**).

C - If serum phosphate level cannot be controlled despite dietary phosphate restriction, phosphate-binders should be prescribed (National Kidney Foundation, 2003) (**Grade C, Level IV**).

C - Calcium-based phosphate binders can be used to lower serum phosphate levels (National Kidney Foundation, 2003) (**Grade C, Level IV**).

C - The total dose of elemental calcium provided by calcium-based phosphate binders should not exceed 1,500 mg/day and the total intake of elemental calcium (including dietary calcium) should not exceed 2,000 mg/day (National Kidney Foundation, 2003) (**Grade C, Level IV**).

C - Serum calcium levels should be maintained within the range of 8.4 to 9.5 mg/dL (2.10 to 2.37 mmol/L), so as to avoid hypercalcaemia (National Kidney Foundation, 2003) (**Grade C, Level IV**).

C - The calcium-phosphate product should be calculated periodically, from values of serum calcium and phosphate, in patients with glomerulonephritis and chronic renal dysfunction (National Kidney Foundation, 2003) (**Grade C, Level IV**).

C - The target calculated calcium-phosphate product is 55 (in mg^2/dL^2) in patients with chronic renal dysfunction. Doses of calcium and Vitamin D analogs should be reduced if the calcium-phosphate product exceeds the target range (National Kidney Foundation, 2003) (**Grade C, Level IV**).

GPP - Target range of intact parathyroid hormone level in patients with chronic renal dysfunction should be listed below (National Kidney Foundation, 2003).

GFR (mL/min/1.73 m^2)	Target intact PTH (pmol/L)
30–59	3.85–7.70
15–29	7.70–12.10

(**GPP**)

A - Patients with chronic renal dysfunction and elevated parathyroid hormone levels above the target ranges should be treated with active vitamin D sterols (Coburn & Maung, 2003; Baker et al., 1989) (**Grade A, Level Ib**).

C - Treatment with active vitamin D sterols for elevated parathyroid hormone levels in patients with chronic renal dysfunction should be undertaken only in patients with levels of corrected serum total calcium <9.5 mg/dL and serum phosphate <4.6 mg/dL. (National Kidney Foundation, 2003) (**Grade C, Level IV**).

C - Patients with glomerulonephritis and renal dysfunction should be evaluated for dyslipidaemia. They should have a complete lipid profile including triglycerides, total, low-density lipoprotein and high-density lipoprotein cholesterol (K/DOQI, 2003; Expert Panel, 2001) (**Grade C, Level IV**).

A - Patients with elevated cholesterol levels should be treated so as to reduce their risk for cardiovascular disease as for patients in the general population. These patients should be treated with cholesterol-reducing diet and statins (K/DOQI, 2003; Expert Panel, 2001; Jungers et al., 1997; Vrecer et al., 2003) (**Grade A, Level Ia**).

A - Patients with elevated cholesterol levels should be treated with statins so as to reduce their risk for progression of renal disease (Bianchi et al, 2003; Nakamura et al., 2002; Fried, Orchard, & Kasiske, 2001) (**Grade A, Level Ia**).

C - Targets for low-density lipoprotein (LDL) cholesterol with therapy in patients with glomerulonephritis and renal dysfunction is <100 mg/dL (K/DOQI, 2003; Expert Panel, 2001) (**Grade C, Level IV**).

C - Serum bicarbonate level should be measured in patients with glomerulonephritis and renal dysfunction so as to detect acidosis (Widmer et al., 1979) (**Grade C, Level IV**).

B - Patients with acidosis (serum bicarbonate level <15 mmol/L) should be treated with an alkali such as sodium bicarbonate. Target serum bicarbonate level with therapy is >22 mmol/L (National Kidney Foundation, 2003; Coen et al., 1996) (**Grade B, Level III**).

Management of Minimal Change Disease in Adults

B - Patients with nephrotic syndrome due to minimal change disease should be treated so as to induce remission of proteinuria (Mak, Short, & Mallick, 1996) (**Grade B, Level III**).

A - High dose prednisolone is recommended for initial treatment of nephrotic syndrome due to minimal change disease (Black, Rose, & Brewer, 1970) (**Grade A, Level Ib**).

B - Daily oral prednisolone at 1 mg/kg/day is recommended for initial treatment of nephrotic syndrome due to minimal change disease (Korbet, Schwartz, & Lewis, 1988) (**Grade B, Level III**).

B - Alternate-day oral prednisolone at 2 mg/kg/day can be used for initial treatment of nephrotic syndrome due to minimal change disease (Wang, Looi, & Chua, 1982; Nair et al., 1987) (**Grade B, Level III**).

B - Steroid resistance should be considered if there is failure to achieve remission of nephrotic syndrome due to minimal change disease by 16 weeks after initiation of corticosteroid therapy (Nolasco et al., 1986; Korbet, Schwartz, & Lewis, 1988) (**Grade B, Level III**).

GPP - High dose prednisolone dose should be continued until remission is achieved unless steroid toxicity or steroid resistance is diagnosed (**GPP**).

A - Prednisolone dose should be tapered after remission in nephrotic syndrome is achieved and subsequently discontinued. Tapering of prednisolone should be performed over 6 months (Imbasciati et al., 1985) (**Grade A, Level Ib**).

B - During taper, alternate-day prednisolone can be used to minimize the side effects of therapy (Wang, Looi, & Chua, 1982; Nair et al., 1987) (**Grade B, Level III**).

B - Patients undergoing prednisolone taper should be monitored for relapse of nephrotic syndrome (Nolasco et al., 1986; Korbet, Schwartz, & Lewis, 1988) (**Grade B, Level III**).

B - Patients who experience a relapse of nephrotic syndrome following a remission should be treated with a second course of corticosteroids (Nolasco et al., 1986; Fujimoto et al., 1991) (**Grade B, Level III**).

GPP - Patients with nephrotic syndrome due to minimal change disease should be monitored for side effects of corticosteroids. Prednisolone doses should be reduced and alternative treatment considered if there is unacceptable steroid toxicity or if steroid resistance is diagnosed (**GPP**).

B - Cytotoxic therapy with cyclophosphamide can be used in the treatment of frequently relapsing or steroid-dependent nephrotic syndrome due to minimal change disease (Al-Khader, Lien, & Aber, 1979) (**Grade B, Level III**).

GPP - Patients in whom cyclophosphamide therapy is planned should be informed of the potential risk for sterility and malignancy. Male patients should be advised to consider sperm storage (**GPP**).

A - Cyclosporin A can be used in the treatment of frequently-relapsing or steroid-dependent nephrotic syndrome due to minimal change disease (Ponticelli et al. "Cyclosporin," 1993) (**Grade A, Level Ib**).

B - Cyclosporin A can be started at a dose of up to 5 mg/kg/day in the treatment of frequently-relapsing or steroid-dependent nephrotic syndrome due to minimal change disease. Cyclosporin A should be administered at these doses for 1 year after which does should be tapered. Cyclosporin A should be discontinued after 3 years (Meyrier, 2003) (**Grade B, Level III**).

B - Cyclosporin A should be administered together with corticosteroids for treatment of nephrotic syndrome due to minimal change disease (Matsumoto et al., 2004) (**Grade B, Level III**).

B - Patients on cyclosporin A therapy for treatment of nephrotic syndrome due to minimal change disease should have periodic monitoring of renal function. A repeat renal biopsy should be considered after a year of cyclosporin A therapy to detect histological evidence of nephrotoxicity (Meyrier et al., 1994) (**Grade B, Level III**).

B - Mycophenolate mofetil can be used for treatment of frequently-relapsing or steroid-dependent nephrotic syndrome due to minimal change disease (Pesavento et al., 2004; Choi et al., 2002) (**Grade B, Level III**).

B - Cyclophosphamide, cyclosporine A, mycophenolate mofetil, or tacrolimus can be used in the treatment of steroid-resistant nephrotic syndrome due to minimal change disease (Nolasco et al., 1986; Day et al., 2002; Tang et al., 2003) (**Grade B, Level III**).

Focal and Segmental Glomerulosclerosis

B - Patients with nephrotic syndrome due to focal and segmental glomerulosclerosis should be treated with immunosuppression so as to induce remission of proteinuria (Rydel et al., 1995; Beaufils et al., 1978; Banfi et al., 1991; Pei et al., 1987; Shiiki et al., 1996; Cattran & Rao, 1998; Stirling et al., 2005) (**Grade B, Level IIIb**).

B - Patients with nephrotic syndrome due to focal and segmental glomerulosclerosis should be treated with steroids (Rydel et al., 1995; Shiiki et al., 1996; Cattran & Rao, 1998; Stirling et al., 2005; Ponticelli et al., 1999) (**Grade B, Level III**).

B - Patients with nephrotic syndrome due to focal and segmental glomerulosclerosis should receive high dose prednisolone at 1 mg/kg/day as initial therapy. High dose steroids should be continued for 1 to 2 weeks after remission is achieved and the tapered slowly (Ponticelli et al., 1999) (**Grade B, Level III**).

B - Total treatment duration with steroids for patients with nephrotic syndrome due to focal and segmental glomerulosclerosis should be for at least 6 months (Rydel et al., 1995; Shiiki et al., 1996; Cattran & Rao, 1998; Stirling et al., 2005; Ponticelli et al., 1999) (**Grade B, Level III**).

B - Patients with nephrotic syndrome due to focal and segmental glomerulosclerosis may be treated with alternative-day steroids to minimise corticosteroid toxicity (Nagai, Cattran, & Pei, 1994) (**Grade B, Level IIb**).

B - Failure to achieve remission of nephrotic syndrome due to focal and egmental glomerulosclerosis by 6 months after initiation of corticosteroid therapy is defined as steroid resistance (Cattran & Rao, 1998) (**Grade B, Level III**).

B - Cytotoxic therapy with cyclophosphamide can be considered for patients with steroid-dependent nephrotic syndrome due to focal and segmental glomerulosclerosis or those with steroid-related side effects (Korbet, 2002) (**Grade B, Level III**).

B - Cytotoxic therapy with cyclophosphamide can be considered as alternative therapy for patients with steroid-resistant nephrotic syndrome due to focal and segmental glomerulosclerosis (Banfi et al., 1991; Shiiki et al., 1996; Korbet, 2002; Martinelli et al., 2004) (**Grade B, Level III**).

B - Patients in whom cyclophosphamide therapy is planned should be informed of the potential risk for sterility; male patients should be advised sperm storage (Pendse, Ginsburg, & Singh, 2004) (**Grade B, Level III**).

B - Cyclosporin A should be considered for patients with steroid-dependant nephrotic syndrome due to focal and segmental glomerulosclerosis or those with steroid-related side effects. As a lasting remission may not be achieved, long-term use may be necessary to maintain remission (Korbet, 2002) (**Grade B, Level III**).

A - Cyclosporin A at starting doses of 3 to 5 mg/kg/day should be considered for patients with steroid-resistant nephrotic syndrome due to focal and segmental glomerulosclerosis. As a lasting remission may not be achieved, long-term use may be necessary to maintain remission (Meyrier, 2003; Ittel et al., 1995; Cattran et al., 1999; Ghiggeri et al., 2004; Ponticelli et al."A randomized trial," 1993) (**Grade A, level Ib**).

B - Cyclosporin A should be administered together with steroids for patients with steroid-resistant nephrotic syndrome due to focal and segmental glomerulosclerosis until remission is achieved. Steroid doses may be tapered subsequently (Ittel et al., 1995; Cattran et al., 1999; Ponticelli et al., 1993; Melocoton et al., 1991; Meyrier, 1997) (**Grade B, Level III**).

B - Patients receiving cyclosporin A for treatment of nephrotic syndrome due to focal and segmental glomerulosclerosis should have renal function monitored (Habib & Niaudet, 1994) (**Grade B, Level III**).

A - Patients with steroid-responsive nephrotic syndrome due to focal and segmental glomerulosclerosis, who are considered for alternative therapy, may be treated with either cyclosporin A or cyclophosphamide (Ponticelli et al. "Cyclosporin," 1993) (**Grade A, level Ib**).

B - Patients with steroid-resistant nephrotic syndrome due to focal and segmental glomerulosclerosis are preferentially treated with cyclosporin A (Korbet, 2002; Cattran et al., 1999) (**Grade B, Level III**).

B - Mycophenolate mofetil may be used in the treatment of nephrotic syndrome due to focal and segmental glomerulosclerosis (Choi et al., 2002; Radhakrishnan, Wang, & Matalon, 1999; Cattran et al., 2004) (**Grade B, Level II**).

B - Tacrolimus may be used as alternative therapy in treatment of nephrotic syndrome due to focal and segmental glomerulosclerosis (Duncan et al., 2004; Segarra et al., 2002) (**Grade B, Level III**).

C - Plasmapheresis may be used as alternative therapy in treatment of nephrotic syndrome due to focal and segmental glomerulosclerosis (**Grade C, Level IV**).

Immunoglobulin A (IgA) Nephropathy

C - No specific therapy is recommended for patients with IgA nephropathy and isolated haematuria without proteinuria (D'Amico, 2000) (**Grade C, Level IV**).

C - Patients with IgA nephropathy and isolated haematuria should be monitored regularly (every 3 to 12 months) for the development of hypertension, renal impairment and proteinuria (Szeto et al., 2001) (**Grade C, Level IV**).

C - No specific therapy is recommended for patients with immunoglobulin A nephropathy and asymptomatic haematuria with proteinuria of 0.15 g/day to 1 g/day and no other adverse clinical or histological indicators (Glassock, 1999) (**Grade C, Level IV**).

C - Patients with IgA nephropathy and haematuria and proteinuria should be monitored regularly (every 3 to 12 months) for the level for proteinuria and the development of hypertension and renal impairment (Glassock, 1999) (**Grade C, Level IV**).

A - Patients with IgA nephropathy and proteinuria ≥1 g/day should be treated so as to reduce the risk of progression of renal failure (Praga et al., 2003; Pozzi et al., 1999; Lee et al., 1997) (**Grade A, Level Ib**).

B - Angiotensin converting enzyme inhibitor therapy is recommended for treatment of hypertension in patients with IgA nephropathy (Cattran, Greenwood, & Ritchie, 1994) (**Grade B, Level IIa**).

A - Angiotensin converting enzyme inhibitor therapy is recommended in normotensive patients with IgA nephropathy and proteinuria $\geq$1 g/day (Maschio et al., 1994) (**Grade A, Level Ib**).

A - Angiotensin II receptor blockers can be used as alternatives to angiotensin converting enzyme inhibitors in patients with IgA nephropathy for similar indications (Woo et al., 2000; Li et al., 2006) (**Grade A, Level Ib**).

A - Angiotensin converting enzyme inhibitors and angiotensin II receptor blockers can be used in combination to reduce proteinuria in patients with IgA nephropathy and proteinuria $\geq$1 g/day (Russo et al., 2001) (**Grade A, Level Ib**)

A - Dipyridamole and low-dose warfarin combination therapy is recommended for patients with IgA nephropathy and proteinuria $\geq$1 g/day. Its use is not contraindicated in patients with abnormal renal function (Lee et al., 1997) (**Grade A, Level Ib**)

B - Fish oil supplementation can be used in patients with IgA nephropathy and proteinuria >3 g/day (Dillon, 1997; Donadio et al., 2001) (**Grade B, Level III)**

A - Corticosteroids can be used for treatment in selected patients with IgA nephropathy (Samuels et al., 2005) (**Grade A, Level Ia**)

GPP - Immunosuppression is not without risk of toxicity and should only be considered in patients with persistent proteinuria ≥1 g/day or in those with evidence of progressive renal damage despite adequate blood pressure control at 130/80 mm Hg or lower with an angiotensin converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB) (Floege, 2003) (**GPP**)

B - Treatment for patients with nephropathy due to IgA nephropathy should be based on findings on renal biopsy (Lai et al., 1986) (**Grade B, Level IIa**)

B - Nephrotic patients with IgA nephropathy and mild histological changes on renal biopsy should be treated with prednisolone at an initial dose of 1 mg/kg/day with subsequent tapering after 4 to 6 weeks for a total treatment period of 3 to 4 months (Lai et al., 1986) (**Grade B, Level IIa**)

B - Nephrotic patients with IgA nephropathy and mild histological changes who have relapses, steroid resistance or steroid dependence should be treated with cyclophosphamide at a dose of 1.5 to 2.0 mg/kg/day for 2 to 3 months together with low-dose prednisolone (Schena, Montenegro, & Scivittaro, 1990) (**Grade B, Level lIa**)

C - Cyclosporin A at an initial dose of 5 mg/kg/day can be used in nephrotic IgA patients with mild histological changes who fail steroid and cyclophosphamide therapy. The recommended treatment period is 6 to 12 months and low- dose prednisolone should be given concomitantly (Pritchard, Milford, & Donoghue, 1997) (**Grade C, Level IV**)

C - Nephrotic IgA patients with histological changes that are not mild can be treated with prednisolone, cyclophosphamide or cyclosporin A, similar to those with mild histological changes (Schena, Montenegro, & Scivittaro, 1990; Woo et al., 1994) (**Grade C, Level IV**)

GPP - As response to immunosuppressive therapy is less favourable in patients with IgA nephropathy and more severe histological changes, over-immunosuppression should be avoided in non-responders. (**GPP**)

C - Patients with IgA nephropathy and acute renal failure should undergo renal biopsy to determine treatment (Lee & Glassock, 1997) (**Grade C, Level IV**)

C - Patients with acute renal failure due to crescenteric IgA nephropathy should be treated as for other forms of crescenteric glomerulonephritis. Treatment with methylprednisolone pulse should be followed by oral prednisolone, cyclophosphamide, dipyridamole and warfarin (Lee & Glassock, 1997) (**Grade C, Level IV**)

GPP - Plasma exchange and intravenous immunoglobulins can be instituted in some patients with crescenteric IgA nephropathy (Lee & Glassock, 1997) (**GPP**)

C - No specific treatment is recommended for patients with IgA nephropathy and acute renal failure in the presence of mild glomerular changes on renal biopsy (Praga et al., 1985) (**Grade C, Level IV**)

Definitions:

Grades of Recommendations

Grade A (evidence levels Ia, Ib): Requires at least one randomised controlled trial as part of the body of literature of overall good quality and consistency addressing the specific recommendation.

Grade B (evidence levels IIa, IIb, III): Requires availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation.

Grade C (evidence level IV): Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality.

Good Practice Points (GPP): Recommended best practice based on the clinical experience of the guideline development group.

Levels of Evidence

Level Ia: Evidence obtained from meta-analysis of randomised controlled trials.

Level Ib: Evidence obtained from at least one randomised controlled trial.

Level IIa: Evidence obtained from at least one well-designed controlled study without randomisation.

Level IIb: Evidence obtained from at least one other type of well-designed quasi-experimental study.

Level III: Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.

Level IV: Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

CLINICAL ALGORITHM(S)

The following are available in the original guideline document:

- Approach to Haematuria
- Approach to Proteinuria

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Early and appropriate detection and management of glomerular disease

POTENTIAL HARMS

Erythropoietin

Adverse effects include hypertension: Recent reports of pure red cell aplasia (PRCA), due to the development of anti-erythropoietin antibodies following the use of some formulations of erythropoietin, suggest the need for continued vigilance and follow-up for complications of erythropoietin use.

Steroids

Prolonged steroid use is associated with a high risk of steroid side effects such as steroid toxicity and steroid resistance. Alternate-day prednisolone is associated with lower risk of steroid toxicity.

Cyclophosphamide

There is a potential risk for sterility and malignancy. Male patients should be advised to consider sperm storage.

Cyclosporin A

Patients on cyclosporin A therapy for treatment of nephrotic syndrome due to minimal change disease should have periodic monitoring of renal function. A repeat renal biopsy should be considered after a year of cyclosporin A therapy to detect histological evidence of nephrotoxicity.

CONTRAINDICATIONS

CONTRAINDICATIONS

Angiotensin converting enzyme inhibitors or angiotensin receptor blockers should not be used in pregnant patients or in those with drug-induced angioedema or allergy. They should also be used with caution in patients with renal artery stenosis or severe hyperkalaemia.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- These guidelines are not intended to serve as a standard of medical care. Standards of medical care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge advances and patterns of care evolve.
- The contents of this publication are guidelines to clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care. Each physician is ultimately responsible for the management of his/her unique patient in the light of the clinical data presented by the patient and the diagnostic and treatment options available.
- Evidence-based clinical practice guidelines are only as current as the evidence that supports them. Users must keep in mind that new evidence could supersede recommendations in these guidelines.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Clinical Quality Improvement

The following clinical quality improvement parameters, based on recommendations in these guidelines, are proposed:

1. Percentage of patients with glomerulonephritis and hypertension on angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs)
2. Percentage of patients with hypertension who have achieved target blood pressure

3. Percentage of patients with blood pressure checked at least once within the last 3 months
4. Percentage of patients with glomerulonephritis who have achieved target proteinuria of <0.5 g/day with therapy
5. Percentage of patients with anaemia workup

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Clinical Algorithm
Staff Training/Competency Material

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Singapore Ministry of Health. Glomerulonephritis. Singapore: Singapore Ministry of Health; 2007 Mar. 130 p. [234 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2001 Oct (revised 2007 Mar)

GUIDELINE DEVELOPER(S)

Singapore Ministry of Health - National Government Agency [Non-U.S.]

GUIDELINE DEVELOPER COMMENT

These guidelines were developed by an expert workgroup appointed by the National Committee on Renal Care.

SOURCE(S) OF FUNDING

Singapore Ministry of Health

GUIDELINE COMMITTEE

Workgroup on Glomerulonephritis

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Singapore Ministry of Health. Glomerulonephritis. Singapore: Singapore Ministry of Health; 2001 Oct. 132 p.

The workgroup advises that these guidelines be scheduled for review five years after publication, or if new evidence appears that requires substantive changes to the recommendations.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Singapore Ministry of Health Web site.

Print copies: Available from the Singapore Ministry of Health, College of Medicine Building, Mezzanine Floor 16 College Rd, Singapore 169854.

AVAILABILITY OF COMPANION DOCUMENTS

Quality indicators and a continuing medical education (CME) self assessment are available in the original guideline document.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on January 8, 2002. The information was verified by the guideline developer on February 22, 2002. This NGC summary was updated by ECRI Institute on August 22, 2007. This summary was updated by ECRI Institute on November 6, 2007, following the U.S. Food and Drug Administration advisory on CellCept (mycophenolate mofetil). This summary was updated by ECRI Institute on March 21, 2008 following the FDA advisory on Erythropoiesis Stimulating Agents. This summary was updated by ECRI Institute on July 8, 2008, following the updated U.S. Food and Drug Administration (FDA) advisory on CellCept (mycophenolate mofetil) and Myfortic (mycophenolate acid). This summary was updated by ECRI Institute on August 15, 2008 following the U.S. Food and Drug Administration advisory on Erythropoiesis Stimulating Agents (ESAs).

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